ON THE ZEROS OF THE RIEMANN ZETA FUNCTION IN THE CRITICAL STRIP. II

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Abstract

We describe extensive computations which show that Riemann's zeta function $\zeta(s)$ has exactly 200,000,001 zeros of the form $\sigma+it$ in the region $0 < t < 81{,}702{,}130.19$; all these zeros are simple and lie on the line $\sigma = 1/2$. This extends a result for the first 81,000,001 zeros, established by Brent in [1]. Counts of the numbers of Gram blocks of various types and the failures of "Rosser's rule" are given.

Comments

Only the Abstract is given here. The full paper, which appeared as [2], extended the results of [1]. A more detailed version appeared as [3]. For further work, see [4].

References

1. R. P. Brent, "On the zeros of the Riemann zeta function in the critical strip", *Mathematics of Computation* 33 (1979), 1361–1372. MR 80g:10033, Zbl 422.10031. rpb047.
2. R. P. Brent, J. van de Lune, H. J. J. te Riele and D. T. Winter, "On the zeros of the Riemann zeta function in the critical strip, II", *Mathematics of Computation* 39 (1982), 681–688. MR 83m:10067. Corrigendum *ibid* 46 (1986), 771. MR 87e:11103. Also appeared as Technical Report NW 121/82, Mathematisch Centrum, Amsterdam; and as Report TR-CS-82-01, Department of Computer Science, ANU, January 1982, 13 pp. rpb070.
3. R. P. Brent, J. van de Lune, H. J. J. te Riele and D. T. Winter, "The first 200,000,001 zeros of Riemann's zeta function", in *Computational Methods in Number Theory* (edited by H. W. Lenstra and R. Tydeman), Math. Centrum, Amsterdam, 1982, 389–403. MR 84h:10003, 84d:10004. rpb081.
4. J. van de Lune, H. J. J. te Riele and D. T. Winter, "On the zeros of the Riemann zeta function in the critical strip, IV", *Mathematics of Computation* 46, 1986, 667–681.

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